

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A pulse detonation wave engine detonation system comprising:

a plurality of detonation banks, each detonation bank having a plurality of detonation chambers for receiving a fuel/oxidizer mixture from a fuel/oxidizer source;

an optical ignition subsystem independent of, and positioned apart from, the detonation banks for generating a plurality of optical pulses, the optical pulses igniting each fuel/oxidizer mixture such that the chambers detonate in a desired order; and

an optical transport subsystem for transporting the optical pulses from the optical ignition subsystem to the chambers.

2. (Original) The detonation system of claim 1 wherein the optical ignition subsystem includes:

an optical energy source for generating optical energy at a predetermined intensity level;

an optical multiplexing device for separating the optical energy such that the optical energy sequentially detonates the banks and simultaneously detonates the chambers within each bank; and

an optical interface for optically coupling the energy source to the multiplexing device.

3. (Original) The detonation system of claim 2 wherein the energy source generates a single pulse of the optical energy, the multiplexing device dividing the single pulse into a plurality of pulses and routing the pulses to the chambers.

4. (Withdrawn) The detonation system of claim 2 wherein the energy source generates a plurality of pulses of the optical energy, the multiplexing device routing the pulses to the chambers.

5. (Original) The detonation system of claim 2 wherein the energy source is a laser.

6. (Original) The detonation system of claim 1 wherein the optical transport subsystem includes a plurality of optical fibers.

7. (Original) The detonation system of claim 1 wherein the optical energy drives each fuel/oxidizer mixture into a self-initiating chemical admixture.

8. (Original) The detonation system of claim 1 wherein the optical pulses are generated in accordance with a predetermined optical intensity equation.

9. (Currently Amended) The detonation system of claim 8 wherein the optical intensity equation is defined by a formula comprising:

$$I_{cr} = \{[mcE_l (1 + (\omega\tau)^2)]/[2\pi e^2 \tau]\}[g + 1 / \tau_p \log_e(\rho_{cr} / \rho_0)]$$

where ρ_{cr} is the critical electron number for breakdown, τ_p is the laser pulsewidth, m , E , c are the electron constants, ω is the optical field frequency, E_i is the ionization energy of the fuel/oxidizer or oxidizer, τ is the momentum transfer collision time, g is the electron loss rate, and ρ_0 is the "initial" electron density.

10. (Currently Amended) An optical ignition subsystem for a pulse detonation wave engine detonation system, the ignition subsystem including:

an optical energy source for generating optical energy at a predetermined intensity level;

an optical multiplexing ~~device~~ apparatus for ~~separating~~ multiplexing the optical energy such that the optical energy sequentially detonates banks of the detonation system and simultaneously detonates chambers contained within each bank, where the detonation banks are positioned independently of and apart from the optical ignition subsystem; and

an optical interface for optically coupling the energy source to the multiplexing ~~device~~ apparatus.

11. (Currently Amended) The ignition subsystem of claim 10 wherein the energy source generates a single pulse of the optical energy, the multiplexing ~~device~~ apparatus dividing the single pulse into a plurality of pulses and routing the pulses to the chambers.

12. (Currently Amended) The detonation system of claim 10 wherein the energy source generates a plurality of pulses of the optical energy, the multiplexing ~~device~~ apparatus routing the pulses to the chambers.

13. (Cancelled)

14. (Currently Amended) A method for detonating a pulse detonation wave engine, the method comprising the steps of:

transporting a fuel/oxidizer mixture from a propellant source to a plurality of detonation banks, each detonation bank having a plurality of detonation chambers;

generating a plurality of optical pulses, the optical pulses igniting each fuel/oxidizer mixture such that the chambers detonate in a desired order; and

transporting the optical pulses to the chambers, where the optical pulses are generated by an optical ignition subsystem positioned independently of, and apart from, the chambers.

15. (Original) The method of claim 14 further including the steps of:
generating optical energy at a predetermined intensity level; and
separating the optical energy such that the optical energy sequentially detonates the banks and simultaneously detonates the chambers within each bank.

16. (Original) The method of claim 15 further including the steps of:
generating a single pulse of the optical energy; and
dividing the single pulse into a plurality of pulses.
17. (Withdrawn) The method of claim 15 further including the step of
generating a plurality of pulses of the optical energy.
18. (Original) The method of claim 14 further including the step of driving
each fuel/oxidizer mixture into a self-initiating chemical admixture.
19. (Currently Amended) ~~The detonation system~~ ignition subsystem of claim
10 wherein the energy source is a laser.
20. (Currently Amended) ~~The detonation system~~ ignition subsystem of claim
10 wherein the optical energy detonates the chambers by igniting a fuel/oxidizer mixture
from a fuel/oxidizer source such that the chambers detonate in a desired order.
21. (Currently Amended) ~~The detonation system~~ ignition subsystem claim 10
further comprising an optical transport subsystem for transporting the optical energy
from the optical multiplexing device to the chambers.
22. (Currently Amended) ~~The detonation system~~ ignition subsystem of claim
21 wherein the optical transport subsystem includes a plurality of optical fibers.

23. (Currently Amended) ~~The detonation system~~ ignition subsystem claim 20 wherein the optical energy drives each fuel/oxidizer mixture into a self-initiating chemical admixture.

24. (Currently Amended) ~~The detonation system~~ ignition subsystem of claim 10 wherein the optical energy is generated in accordance with a predetermined optical intensity equation.

25. (Currently Amended) ~~The detonation system~~ ignition subsystem of claim 24 wherein the optical intensity equation is defined by the formula comprising:

$$I_{cr} = \{[mcE_i (1 + (\omega\tau)^2)]/[2\pi e^2 \tau]\}[g + 1 / \tau_p \log_e(\rho_{cr} / \rho_0)]$$

where ρ_{cr} is the critical electron number for breakdown, τ_p is the laser pulsewidth, m , E , c are the electron constants, ω is the optical field frequency, E_i is the ionization energy of the fuel/oxidizer or oxidizer, τ is the momentum transfer collision time, g is the electron loss rate, and ρ_0 is the "initial" electron density.